

MISCELLANEOUS.

The Echinoid Name Cidaris and its Modern Application.

By F. A. BATHER, British Museum (Nat. Hist.).

FOR many years past the writers on Echinoidea have been at loggerheads over the meaning to be attached to the name *Cidaris*, and, as was pointed out to them in the Introduction to the 'Zoological Record' for 1903 (Section "Echinoderma"), the confusion seemed likely to continue until they decided "who, under the rules of nomenclature, was its author, or which species was the genotype." At last a few have ventured on this attempt; but the conflict of opinion continues. It would be safer to remain a spectator, but having now occasion to discuss some genera of Cidaridæ, I have been forced to choose a side in the quarrel. This choice has been determined by the elaborate and carefully considered rules recently issued by the Nomenclature Committee of the International Congress of Zoologists—rules by which every zoologist should feel bound, whatever his private views or previous practice. As an example of their application to an old and common genus, the present enquiry may have more than a special interest.

How does the case stand? Taking only leading writers during the present century, we find J. Lambert * saying "*Cidaris*, dont le type est le *C. mauri* Schynwoet, 1711"; T. Mortensen † says "*Cidaris* Klein (emend.)," and, from page 19, it appears that he regards *Echinus cidaris* Linn. as genotype, and believes that Lovén showed this to be identical with *C. baculosa* Lamarck; L. Doederlein ‡ has changed his view once since 1900, and his latest statement is "*Cidaris* Leske (Syn. *Dorocularis* A. Agassiz), Type *C. papillata* Leske"; H. L. Clark § says "*Cidaris* Leske. Type species *tribuloides* Lamarck."

Preliminary criticism of the simplest kind shows that Mr. Lambert's view, however logical from his peculiar standpoint, is out of court. The Dutch author S. Schynwoet was entirely pre-Linnean; the name "*Cidaris mauri*" occurs also in the equally pre-Linnean Klein || under *Cidaris mammillata* (p. 19), and is supposed by A. Agassiz ¶ to be a synonym of "*Phyllacanthus imperialis* Brandt," = *Cidarites imperialis* Lamarck. If the last-mentioned has any claim to be the genotype of *Cidaris*, that claim cannot be based on *C. mauri*.

We pass to Dr. Mortensen. It is a contradiction to ascribe

* 1902. "Ech. foss. Barcelone, 1^e partie," Mém. Soc. géol. France, Pal., ix. fasc. 3, Mém. 24, p. 27.

† 1903. 'Ingolf' Exped. vol. iv. Echinoidea, pt. 1, p. 28. Copenhagen.

‡ 1906. "Echinoiden," Wiss. Ergeb. der deutschen Tiefsee-Exped. Bd. v. Lief. 2. Jena.

§ 1907. "The Cidaridæ," Bull. Mus. Comp. Zool. Harvard, li. no. 7.

|| 1734. 'Naturalis dispositio Echinodermatum.' Gedani.

¶ 1872. 'Revision of the Echini,' p. 175. Cambridge, Mass.

Ciliaris to Klein, 1734, and to take as genotype *Echinus cidaris* Linn., a species that dates at earliest from 1752. To the bearing of this specific name on the post-Linnean *Ciliaris* we shall recur, merely pointing out that, if it equals *C. baculosa*, then *Cidaris* replaces *Phyllacanthus* Brandt, according to the usual diagnoses and content of that genus, though not according to the views of Mortensen.

Professors Doederlein and Clark, it will be observed, agree in ascribing *Ciliaris* to Leske*, and here they appear to be in complete accord with the facts and with every code of nomenclature. They differ, however, as to the genotype, for which, to all appearance, Clark adopts a species not mentioned by Leske. Such a course is not permissible unless the later name can be shown to have supplanted one of Leske's names. Prof. Clark does, in fact, attempt to justify his choice by stating that his genotype, *Cidarites tribulooides* Lam., was included in *Cidaris papillata* Leske, and that it was selected as type by Brandt. The former statement is correct in so far as Lamarck himself referred to Leske's figure of *Cidaris papillata*, var. *minor* Leske, a reference which was accepted by A. Agassiz (1872, 'Revision,' p. 99). It therefore appears that Clark, no less than Doederlein, regards *Cidaris papillata* Leske as containing the genotype; indeed, he says that all the rest of Leske's twenty-eight species have been removed to other families.

Taking, then, Leske as author of *Cidaris*, let us apply the rules of nomenclature. Those relating to the determination of a genotype are now summarized in Article 30 of the International Code†. Applying them in order of precedence, as we are definitely instructed to do, we are checked first by (d): "If a genus, without originally designated or indicated type, contains among its original species one possessing the generic name as its specific or subspecific name, either as valid name or synonym, that species or subspecies becomes *ipso facto* type of the genus." Now the opening sentences of Leske's "Additamentum ad Kleinii § 21. Species II. *Cidaris mauri* &c." (1778, p. 125) run thus: "Spec. XIX. *Cidaris papillata*. Tab. VII. Non possum non, quin hic iterum cum KLEINIO et LINNEO sentiam, qui ad unam speciem referunt omnes varietates, quis alii, præsertim Cl. VAN PHÉLsum, species esse existimant. Nominatur hæc species a LINNEO: *Echinus cidaris*, hemispharico depressus; ambulacris quinque repandis linearibus; arcibus alternatim bifariis. *S. N. p. 1103. sp. 8. Mus. L. vi. p. 710. Faun. Svec. p. 513, n. 2118.*" The diagnosis quoted is that of Syst. Nat. ed. x. (1758). It would not have been possible for Leske to say more plainly or precisely that he regarded his *C. papillata* and *Echinus cidaris* Linn. as synonymous. It seems to follow that, whichever name be accepted, this species must be the genotype by rule (d).

* 1778. 'Additamenta ad Klein': Lipsiæ, pp. xvii, 74, et seqq.

† See 'Science,' n. s. xxvi. p. 521; Oct. 1907. Also J. A. Allen, 1907, "A List of the Genera and Subgenera of North-American Birds," Bull. Amer. Mus. Nat. Hist. xxiv. pp. 1-50.

Since *C. papillata* Leske is merely a substitute for the pre-Linnean and non-binominal "*Civlaris Mammillata Mauri*" of Klein, Lambert also may be claimed as a supporter of this view. Happily, then, our four twentieth-century authorities seem to be essentially in agreement with the course that the rule imposes. It is with the next step that trouble begins.

It is generally admitted that *Cidaris papillata* Leske is a composite species. Leske himself (1778, pp. 125 *et seq.*) divided it into four varieties: I. *major*, Tab. vii. A, Tab. xxxix. f. 2; II. *minor*, Tab. vii. B, Tab. xxxvii. f. 3; III. *spinis conoideis*, a *SCILLA* tab. xxii. f. 1, 2, 3 *delineata*; IV. *spinis claviculatis*. The last includes only various fossils not regarded as truly characteristic. The first three varieties were placed by Lamarek* in three fresh species: I. *Cidarites imperialis*; II. *C. tribuloides*; III. *C. hystrix*. Those references are on the whole accepted in A. Agassiz (1872, 'Revision,' pp. 151, 99, 105 respectively). Since Lamarek made no other mention of *Cidaris papillata*, it seems to follow that one of his three species must fall into the synonymy of that species. The obvious course would have been to take Var. I. as the type of *C. papillata*; but, as things happened, the name *papillata* became generally attached to a form that appears to represent *C. hystrix*. Therefore it is safest to follow A. Agassiz and others in regarding *C. hystrix* as a synonym of *C. papillata*; otherwise there would be terrible confusion.

We have, then, three species representing the original *C. papillata*, viz. I. *imperialis* Lam., II. *tribuloides* Lam., III. *papillata* Leske. The last of these must be regarded as carrying on the traditions of the species, so to speak. Its holotype is the specimen from Sicilian seas figured as a "Hystrix" by Scilla (1759, 'De corporibus marinis lapidescentibus,' ed. 2, tab. xxii. f. 1, 2, 3). Now, as we have already agreed that *C. papillata* Leske is the type of *Cidaris*, and as we have now defined *C. papillata* Leske, it might seem that the question was settled. Not so!

Let it be remembered that the reason for selecting *C. papillata* as genotype of *Cidaris* was its alleged synonymy with *Echinus cidaris* Linn. But if the species be thus divided, the hegemony might be held to lie with that division which corresponded to *Echinus cidaris*. Here a totally different difficulty arises. Mortensen, for instance, professing to follow Lovén, identifies *Echinus cidaris* with *Cidarites baculosa* Lam., and therefore regards the last-mentioned species as the genotype, although no one has hitherto supposed it to represent a Leskian species. This course, however, depends on a misreading of Lovén, who has discussed the meaning of *Echinus cidaris* at great length †. Lovén shows that the type-specimen of *Echinus cidaris* Linn., 1752, belongs to *Cidarites baculosa* Lam. We, however, are concerned not with this, but with *Echinus cidaris* Linn., 1758. Here the diagnosis was altered from "globoso-depressus" to "hemisphærico-depressus," and

* 1816. 'Hist. nat. Anim. sans Vertèbres,' iii. pp. 54-56.

† 1887. "Echinoidea descr. by Linnæus," Bih. Svensk. Vet.-Akad. Handl. xiii. Afd. 4, no. 5, pp. 138 *et seq.*

references were added to *Cidaris mammillata mauri* of Klein and to *Echinometra digitata* 2 of Rumph, both of which are included by Leske in *C. papillata*. Lovén therefore supposes (*op. cit.* p. 149) that "the species which caused him [Linnaeus] to alter the word 'globoso' to 'hemisphaerico' was . . . the *Cidaris papillata* Leske." This conclusion is confirmed, in Lovén's opinion, by the change of habitat from the East Indies (1752) to the Ocean (1758) and the Norwegian Ocean (1761, 'Fauna Suecica'). The reasoning seems inevitable that *Echinus cidaris* Linn., 1758, was rightly regarded by Leske as synonymous with his *Cidaris papillata*, and that, to be more precise, it corresponded with Leske's var. 3, which now is the restricted and universally accepted *C. papillata*. So clear is this that it is really hard to see why this species should not be called *Cidaris cidaris* (Linn.).

I have worked out this conclusion quite independently; it agrees with the conclusion reached by Doederlein in 1906. Clark objects to it because *Dorocidaris* A. Ag. thus becomes a synonym of *Cidaris*; and he correctly says that Doederlein does not discuss the divisions of *C. papillata* Leske. The preceding discussion shows, however, that the same conclusion would have followed had he done so. Clark, it is true, comes to different conclusions in the process, but he does not use the rule of type by tautonomy. Doederlein appears to have acted on the principle of elimination, which, so far as I can see, does lead to his conclusion. Clark applies in addition rule (*g*) of the International Code, or Type by subsequent designation. This certainly takes precedence of elimination, and it will be interesting to see how Clark applies it—ignoring for the moment the Tautonomy rule.

Clark says (p. 174) "Brandt, who was the first writer to subdivide *Cidaris*, distinctly states that *tribulooides* is the type of *Cidaris* s. str." I suppose that Clark is here referring to J. F. Brandt (1835) †, but, if so, he can hardly be speaking by the book. Brandt did nothing of the kind. Here are his actual words (p. 67):—"Genus *Cidarites* Lamk. Subgen. [nov.] *Phyllacanthus* Br. . . . (p. 68) Sectio B. Nob.* Spec. I. *Cidarites* (*Phyllacanthus*) *dubia* Br. [sp. nov.] . . . Sectioni B. e specierum cognitarum numero adjungendæ, *C. imperialis* Lamk. . . . *C. hystrix*. . . . *C. geranioides* . . . *C. pistillaris*. . . . [Footnote]* Sectio A seu prima subgeneris *Phyllacanthus*. . . . amplectitur *Cidaritidem tribulooidem* Lamarckii aliasque affines." It is clear that Brandt mentions no species of *Cidaris* s. str. Brandt; that every species mentioned is referred by him to his new subgenus *Phyllacanthus*; that he fixes on no type; that, though the species which, owing to our conventions with regard to footnotes, comes highest on the page is *C. dubia*, yet the species that comes first in reading, in actual writing, and in sense is the only species named under Sectio A, viz. *Cidarites* (*Phyllacanthus*) *tribulooides*. I do not here propose to enquire whether any valid reason exists for considering *C. dubia* (= *imperialis* Lam.) as genotype of *Phyllacanthus*: the question does not concern

† 'Prodromus descript. anim. ab H. Mertensio . . . observ. . . ' Fasc. i. Petropoli.

the subject of this paper. But I do deny that Brandt made *C. tribuloides* genotype of a restricted *Cidaris*.

If the rule of first reviser is to be applied, we must turn to a paper quoted by many, but entirely overlooked by Prof. Clark. J. E. Gray (1825, Ann. Philos. xxvi. p. 426) fixed the genotype as *C. imperialis* Lam., still further defining that species by a reference to Klein, t. vii. f. A. This, it will be remembered, was the type of Leske's Var. I. *major*; it was also the first species mentioned by Lamarck; therefore on both counts Gray was only following the dictates of common-sense in taking it as the genotype. Under the rules of nomenclature, however, this choice can be justified only by reinstating *papillata* as the trivial name of this species, leaving *hystrix* to Leske's Var. III. This conclusion would, of course, cut out *Phyllacanthus*, a much older genus than *Dorocidaris*.

This line of argument need not, however, be pursued further. *Cidaris imperialis*, by whatever name it be called, is excluded by the previous application of the tautonomy rule. The genotype of *Cidaris* by that rule is *C. papillata* = *Echinus cidaris*.

Among the results, "unfortunate" or otherwise, of this rule are the retention of *Phyllacanthus*, the suppression of the name *Dorocidaris*, and its replacement by *Cidaris* transferred from the section to which it is applied by Clark (viz. *C. metularia*, *C. tribuloides*, *C. thouarsi*), as well as from that to which it is applied by Mortensen (viz. the same three species + *C. affinis*, *C. reini*, and *C. baculosa*, of which the two former are referred by Clark to *Tretocidaris* Mortensen, and the last to *Phyllacanthus*). For a genus including all these species and others Doederlein (1906) has revived the name *Cidarites* Lamarck, without fixing on a genotype. In Clark's protest against this resurrection I heartily join, for the simple reason that Leske himself used *Cidarites* and *Cidaris* indifferently, applying the former name to *C. excavatus*, *C. coronalis*, *C. corollaris*, *C. circinnatus*, and *C. ovarius* merely because they were fossils. As Clark says, *Cidarites*, in Lamarck's sense, "is clearly a substitute for, and synonym of, *Cidaris*."

If a generic name be required for this section, one is already provided in *Gymnocidaris* A. Agassiz, 1863, with genotype *Cidaris metularia*.

The main results of this enquiry may be summarized thus:—

CIDARIS Leske (synn. *Cidarites* Lam., *Dorocidaris* A. Ag.).

Genotype, *C. papillata* Leske, restr. (synn. *Echinus cidaris* Linn., 1758, and *Cidarites hystrix* Lam.).

GYMNOCIDARIS A. Ag. (synn. *Cidarites* restr. Doederlein, *Cidaris* restr. Clark).

Genotype, *G. metularia* (Lam.).

PHYLLACANTHUS Brandt (syn. *Cidaris* restr. Gray).

Genotype, *P. imperialis* (Lam.).

I express no opinion as to the validity or extent of these generic divisions.